and uncertain funding, the first goal of the mitigation program should target high risk homes in the highest priority areas. In order to accomplish this goal, a method was developed to help sort out the individual homes with the highest risk. The method used for evaluating the risk to individual dwellings is discussed later in the plan, under the heading "**Evaluating Individual Homes For Risk.**"

USING GIS TO ASSESS RISK

In reviewing information pertinent to where the community is in the most jeopardy from potential forest fires, we went from the most general information to the most specific. The final pictures we get from a federal analysis are maps of where we can expect fires that would cause the most damage to communities (Communities at Risk), and where we can expect fires that would be the hardest to control (crown fire potential). Using federal database information and local Bonner County Assessor data on the value of properties in each square mile, we get a picture of where the greater value is located and where most fires have historically started. Local fire districts also outlined the areas within their district where they feel the most danger lies.

Each of these steps brings us closer to where hazardous fuels treatment work should be concentrated on the ground. These steps will also aid in the review of what has been done and the evaluation of how effective it has been in protecting the community. Each avenue of analysis provides checks and balances to the others. If fire districts say "Start here," we are going to start there. But we are also seeing dangers outside of current fire districts. This large-scale analysis generally confirms that the priority areas chosen by the fire districts are valid.

Fire naturally regulates itself. It is not likely to burn the same area for several years after the last burn. But in the process of becoming a mature forest, timber stands will quickly reach stages where the fire danger is high again. Our suppression efforts suffer the same fate. Without constant maintenance and observation, they lapse into high risk again. The current analysis is the beginning of a body of knowledge about how Bonner County can best protect itself against wildfire. It is certainly not the end.

The Components
The federal data used for this analysis came from the *National Fire Plan Cohesive Strategy Team, Northern Regional Division for North Idaho and Montana*. The team was spearheaded by the Flathead National Forest. Lead investigator for the Flathead Forest was Don Krogstad**.** Additional analysis related to population density was done by Jim Schumacher of the Wildlife Spatial Analysis Lab at The University of Montana in Missoula.

The team gathered base data in three categories: 1) The **status** of the current land cover, 2) the **risk** for occurrence of fire and 3) the **opportunity** to mitigate dangers to the population and the environment. From these components, they developed data themes that answered a series of questions about the status, risks and opportunities for wildfire

mitigation. Background information on these themes included the sources of their information, the assumptions they made in combining it, the methods they used and the cautions to consider. The result is a series of map grids. Each unit of a grid (typically 90 meter squares, derived from satellite imagery) is represented by a color that paints a picture related to a particular topic (also referred to as "theme").

Snapshots of each theme are included in this text. It is important to remember that this information covered a much larger area than Bonner County, and has not been updated with information for fires since 2001. The goal of this report is to understand this data and pose informed questions about the application of this information to Bonner County.

Sixty-One Year Fire History
The Cohesive Strategy Team assembled information from each of the forests in the region for each decade since 1940. They drew outlines of each fire in that period, identified the related habitat, and the frequency of those fires.

MAP 1

The resulting map (Map 1) shows frequent fires, particularly in the Spirit Lake, area but in many other areas as well. Only rocky mountaintops seem exempt. This theme will be a prime component of many subsequent themes. A major implication will be that fire is a natural part of most local ecologies. This map shows us what we can expect to occur naturally. Red areas on the map depicted highest frequency of fires.
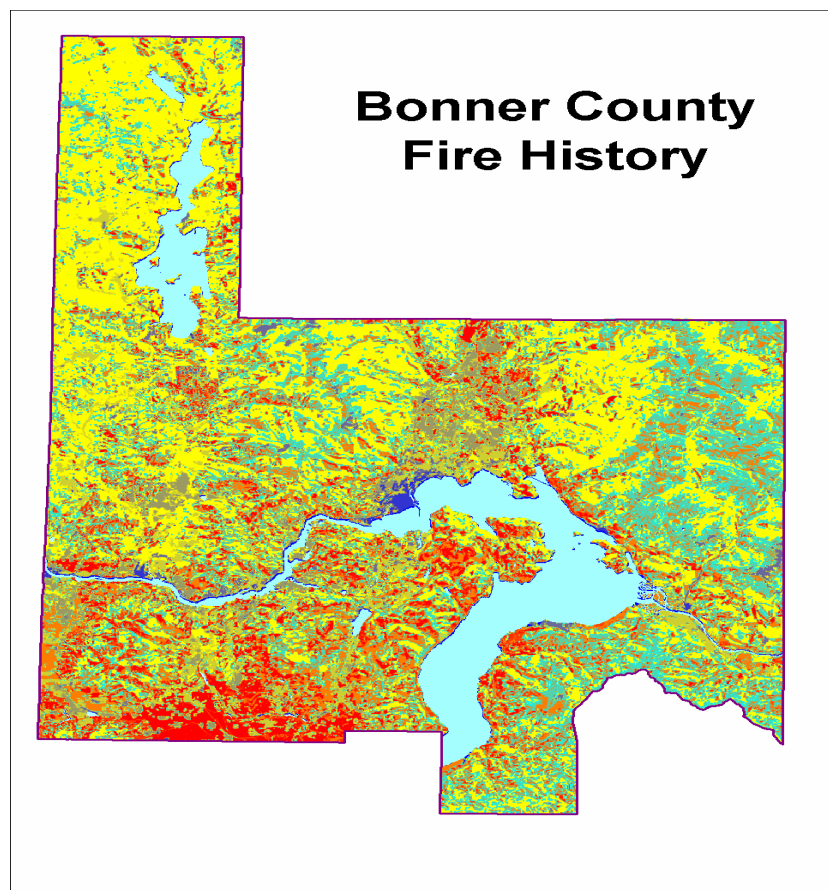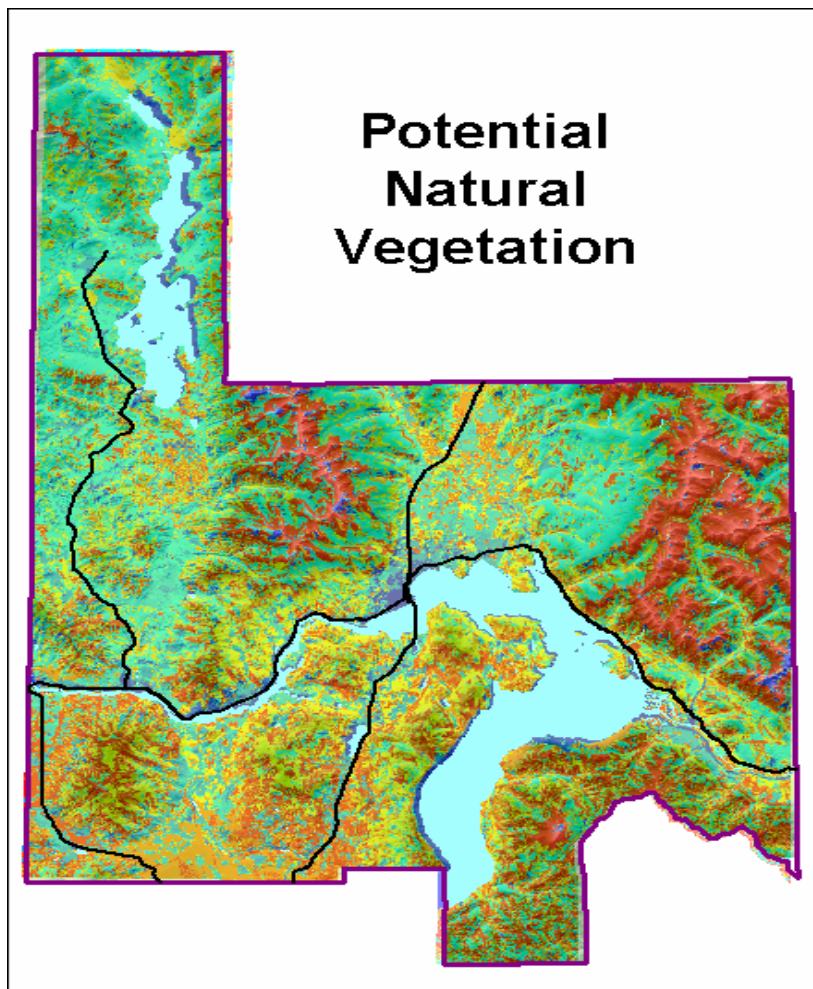

Natural Vegetation
General patterns of Potential Natural Vegetation (PNV) correspond to soil, weather, elevation, exposure to sun, wind, rain and many other factors. The information gathered over the years by foresters, biologists, climatologists and cartographers was

divided for the purposes of this study into 38 vegetation classes, mostly forest, but also including shrubs and grassland. The accuracy is only purported to be 60% for any given point, since not all parts of this vast area were examined equally. This theme answers the question, "What can we expect to grow in any particular region if human caused disturbance does not occur." It does not guarantee what we will actually find there, given factors such as cultivation, timber harvest, land development and fire itself. Map 2 shows the potential natural vegetation for Bonner County (each color on the map represents a type of vegetative cover and does not necessarily represent fire danger potential).

MAP 2

Canopy to Severity

Satellite Imagery was used by the Forest Service Team to evaluate forest canopy density. This information was then combined with the Natural Vegetation analysis to estimate size class for trees in wooded areas. Comparing the fire history with the PNV, and factoring in slope and aspect, researchers developed a model of the Historic Fire Regimes. These regimes indicate how often fires naturally occurred and how they affected the ecology. Comparing them with current size classes and cover types indicates how much fuel is in any particular part of the forest and what kind of ecology it occupies. The result is an estimate of the fire severity potential throughout the forest. A chart in Appendix C depicts the steps in this analysis.

Fire Condition Class and Crown Fire Potential

> **"As used here, fire-regime condition classes reflect the probability that key ecosystem components may be lost should a fire occur."**

The Fire Condition Class looks at what conditions exist now that are outside the normal historical range of fire regimes. The fire condition class information will help determine where the biggest threats to human populations exist and where the most damaging fires, crown fires, could erupt. The assumptions used by the Cohesive Strategy Team in this analysis can be found in Appendix D. When the probability of fire ignition is factored in, based on the 20 year history of fire starts, we get a picture of what areas have the greatest crown fire potential. Knowing where the highest crown fire potential may be is a major part of the risk assessment equation. However, the assessment is not complete without considering modern day human settlement patterns across the landscape.
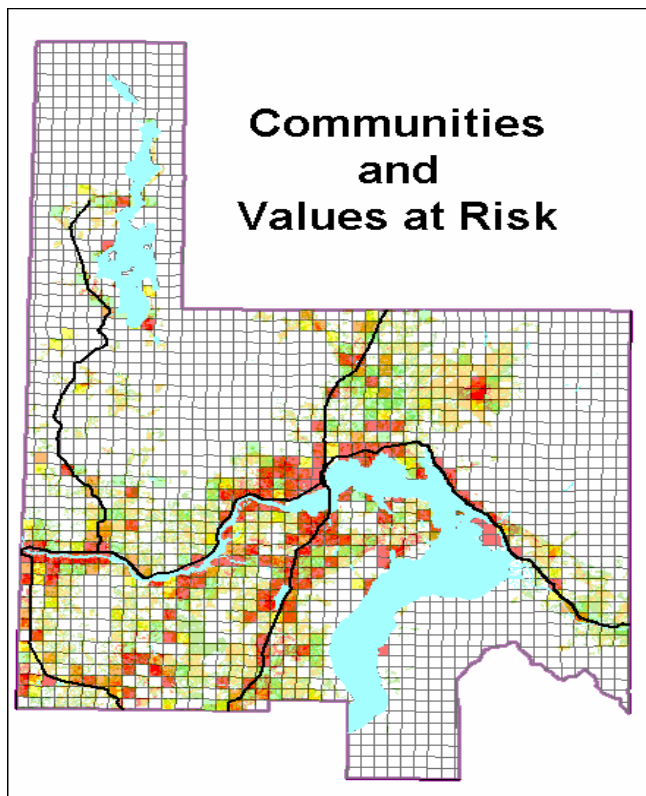
When Fire Regime Condition Class is correlated to population density and ignition probability, we finally see where the most highly populated areas merge with forests that are at the greatest risk of burning. This is the Communities at Risk picture as generated by Federal data and is show in Map 3 on page --.
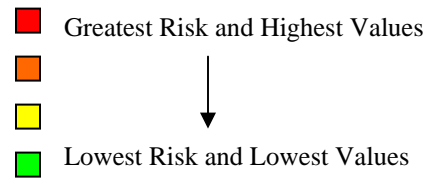
The Local Analysis

To more accurately reflect conditions within Bonner County, the risk assessment also evaluated information provided by the Bonner County Assessor. This information included parcel geographic data, ownership, value and other attributes. The county data was combined with crown fire potential to determine where high risk and high value areas coincide in the county. This is depicted in Map 4 on page--.

The areas determined to be at high risk and high value using this analysis correlate strongly with the high-priority locations identified by the local fire agencies. One can see the close correlation between the GIS risk analysis and the priorities established by fire agencies by comparing Maps 3 and 4 found on page---. Larger versions of Maps 3 and 4 can be found in Appendix G.
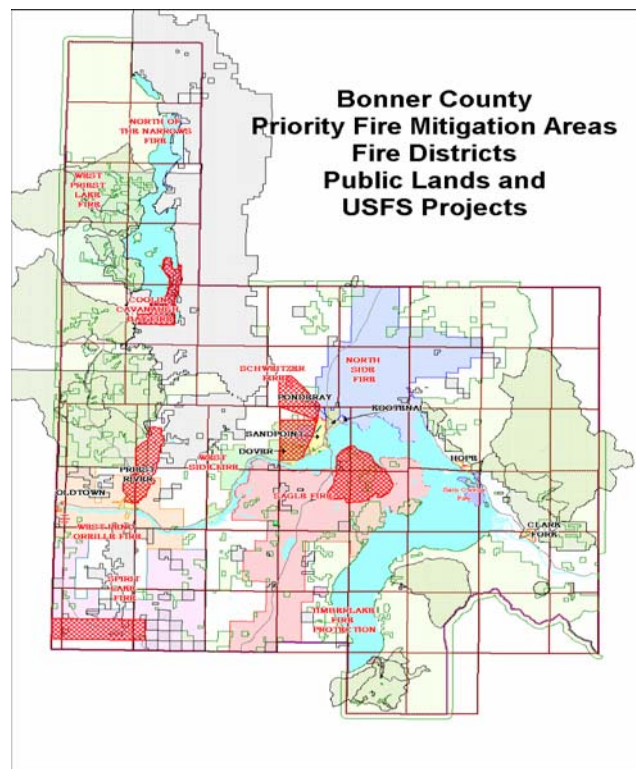
MAP 3

Communities and Values at Risk

Map 3 Legend

■ Greatest Risk and Highest Values
■
■
↓
■ Lowest Risk and Lowest Values

MAP 4

Map 4 Legend

Fire Agency High Priority Areas

Forest Service HFT Projects

Bonner County
Priority Fire Mitigation Areas
Fire Districts
Public Lands and
USFS Projects

Bonner County Fire Mitigation Plan
Prepared by Inland Forest Management, Inc.

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